

15th International Congress of Hypnose

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c/o Charlotte Wirtl, Dr.med., Waldmeisterg. 43, A-1140 Wien, Tel: +43/1/9141796,
founded 1989, founding president: Wolfgang Ladenbauer, MD

Photo-acoustic stimulation and hypnotherapy. An effective combination for treatment of oral psychosomatic disorders

■ One of the most difficult problems in the treatment of oral psychosomatic patients is their refusal of psychotherapy, which could possibly lead to the resolution of their symptoms. The method introduced in the present paper may be a possible solution of this problem. As a preclinical part of this study we measured and demonstrated the effectiveness of 15 min. mixed (8Hz mean frequency) photic stimulation (n=33) compared to simple relaxation (n=33) and hypnosis (n=13) to induce trance phenomena in university students as participants. Three relevant scales (altered state of awareness; altered experiences; and arousal) of the Hungarian version of Pekala's Phenomenology of Consciousness Inventory (PCI) as psychometric instrument, and salivary secretion alterations as a sensitive indicator of psycho-physiological changes were used for this purposes. Photic stimulation induced significantly ($p<0.05$) higher alterations of awareness than relaxation, and significantly ($p<0.05$) stronger decrease of arousal than hypnosis did. In the case of photic stimulation salivary protein concentration was significantly ($p<0.05$) decreased, and amylase secretion was significantly ($p<0.05$) increased comparing to the hypnotic values. Hypnosis induced significantly ($p<0.05$) stronger decrease of saliva volume than relaxation. There were no other significant differences related to gender or any other parameters of the subjects. As a clinical part of this study, oral psychosomatic patients (n=11) were treated, with the use of photic and acoustic stimulation combined with hypnotic techniques. The method was highly effective in the quick palliation of the psychogenic symptoms in 7 (64%) of the 11 patients, and moderately effective in the remainder patients treated (36%). In all the cases (100%) the treatment increased the belief of the patients in the psychological treatment, and developed a good patient-therapist relationship to start the longer exploratory part of their psychotherapy, which may lead to a permanent improvement of such cases.

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One of the most difficult problems in the treatment of oral psychosomatic patients is their refusal of psychotherapy, as the latter could possibly lead to the definitive treatment of their symptom causing psychopathological conditions (Fábán & Fábán, 2000). In our earlier publication about the psychological problems related to the orofacial tissues (Fábán & Fábán, 1998), we described a symbolic hypnotic method that can be used in these psychosomatic disorders as an initial phase of psychotherapy. The method in most cases produced a remarkable early improvement of the symptoms. This quick effect was very impressive to the patients, and motivated them to continue the longer, exploratory part of the psychotherapy. In the last few years the authors developed another possible technique to treat such patients using photo-acoustic stimulation with the combination of hypnotherapy. The results became even more convincing when compared to those obtained by the symbolic hypnotic method. The increased effectiveness of the hypnotherapy combined with photo-acoustic stimulation can be originated from two main reasons discussed below:

1. Strong effects of photo-acoustic stimulation on the central nervous system

One of the earliest publications on photic stimulations published by Berger (1930) when he demonstrated the decreasing effect of photic stimulation on the amplitude of alpha waves on EEG. In agreement with these early results of Berger (1930), an occipital decrease of alpha density (average of alpha wave's amplitude) has been found by Kawabata (1972) using a 10 Hz frequency flash light stimulus or a confluent stimulus for 2 sec. on closed eyes. These effects have been called as "light on effect". The same effect has been found by him when he turned the 2 sec light off. This effect has been called as "light off effect". Further, Pfürtscheller, Aranibar and Maresh (1979) have found that the event related desynchronisation (decrease of the alpha activity) between the "light on" and "light off" effects positively correlated with the decreasing effect of the "on" effect. Aranibar and Pfürtscheller (1978) also published results about the positive correlation between the "on" effect and the intensity of the photic stimulus, and about the specific sensor modality of the "on" and "off" effects. The "on" and "off" effects were more effective in the occipital region of the brain in the case of photic stimulation, and in the centric region of the brain in the case of acoustic one.

All above data indicate an effective stimulating effect of the photo-acoustic stimulation on the most part of the central nervous system. From the available few data in the literature it seems that, the photo-acoustic stimulation, besides its powerful stimulating effect on the central nervous system as a short stimulus, paradoxically leads to the relaxation of the body and mind in case of long-term stimulation (most likely because of the habituation to the stimuli). This opinion was also supported by the results of Williams and West (1975) who investigated the long lasting effect of photic stimulation on the EEG, and the effect was sleepiness and a mixed alpha-theta activation.

Similar results have been published by Brauchli (1993) who compared the effect of photo-acoustic stimulation with that of relaxing music mixed with pleasant natural noises. In both cases a decreased EMG activity, and an increased skin resistance have been found during the treatment, and a decreased level of salivary cortisol, and an increased level of salivary secretory IgA have been found after the treatment. In both test groups a "warm" and "calm" subjective feeling have been reported by the participants.

2. The interaction between the photo-acoustic stimulation and the hypnotic trance state

In contrast to the results mentioned above, Wallace (1970) demonstrated a confluent stimulating effect of long lasting photic stimulation in auto-trance conditions (during meditation). In the case of practised participants, the habituation of the long-term photic stimuli did not appear, therefore the EEG indicated a confluent long-term alpha-desynchronisation with a consequently increased arousal level. Our experience was similar to this, since in the case of photo-acoustic stimulation combined with hypnotherapy, intensive imagination and/or other trance phenomena occurred, with a parallel body relaxation. We suppose that the long lasting (ca. 20-30 minutes) photo-acoustic stimulation activates the psychological functions during hypnotic trance state, whereas it helps to keep the body relaxed. This complex effect of psychological activation connected with body relaxation may be the reason of the more powerful effect of this technique compared to the earlier hypnotic method developed by the authors (Fábán & Fábán, 1998). It is possible however that, some other factors (i.e.: spontaneous trance inducing ability of the technique) may play an important role as well.

Aim

In the present paper as a preclinical part, the authors want to investigate some aspects of the possible spontaneous trance inducing effectivity of the method comparing to simple relaxation and hypnosis. The subjective effects were tapped by phenomenological instruments, and saliva secretion alterations were used as a somatic measure of the various trance conditions (Olness, Culbert & Uden, 1989; Brauchly, 1993). As a clinical part, the clinical effectiveness of the method in the case of the initial phase of psychotherapy of oral psychosomatic patients is demonstrated.

Method

A: Pre-clinical studies

Subjects: 33 university students of the Eötvös Loránd University were investigated. 15 of the participants were male and 18 female. Age ranged from 20 to 21 years. All of the students participated in photic stimulation and relaxation (n=33), from which 13 participated in group-hypnosis too (n=13; called as "hypnosis group").

Procedure: Students were called first individually for relaxation and photic stimulation in two separate sittings. Following this, students were invited for group-hypnosis,

but they were informed about this possibility only after the relaxation and photic stimulation experiments, to prevent associating relaxation and photic stimulation with hypnosis in the student's mind, (which may release expectations of trance phenomenon). Thirteen of the students decided to participate in this hypnotic part of the investigation as well ("hypnosis group", see above).

Photic stimulation: 15 min of mixed (8Hz mean frequency) photic stimulation was used. The stimulation was carried out with the use of a signaller ("David paradise XL", Comptronics Devices Ltd. Edmonton, Alberta, Canada) through closed eyes, in sitting position.

Relaxation: Participants were asked to sit relaxed and quietly with closed eyes for 15 minutes, in a comfortable armchair.

Hypnosis: The Hungarian version (Greguss, Bányai, Mészáros, Csókai & Gerbner, 1975) of the standard text of the Harvard Group Scale of Hypnotic Susceptibility Form A (HGSHS) (Shor & Orne, 1962) was used for this purpose, with a slight modification. The participants were asked to cumulate saliva in their mouth from that time they started to concentrate to the "target on their hand", and they were asked to spit it into a collecting vessel at the termination of the induction phase (ca. 15 min).

Hypnotic susceptibility: Hypnotic susceptibility (HGSHS score) was measured only in the case of "hypnosis group".

Monitoring of trance induction: The Hungarian version (Szabó, 1989; see also Szabó, 1993; Varga, Józsa, Bányai, Gösi-Greguss & Kumar, 2001) of the Phenomenology of Consciousness Inventory (PCI) (Pekala, 1982, 1991) Form I and II were used to assess phenomenological experiences. Unlike the usual application, the phenomenological states were mapped by having subjects complete the PCI in reference to the whole preceding stimulus condition, immediately following the completion of the session. Out of the various scales of PCI this analysis focuses only on three scales most relevant to the aim of this paper: (1) altered state of awareness, (2) altered experiences (body image, time sense, perception, and meaning) and (3) arousal, i.e. lack of relaxation. (The more detailed analysis of the phenomenological pattern including the further scales will be discussed in another paper.)

Collection and handling of saliva: Whole saliva was collected, with the method described by Schwartz, Zhu and Sreebny (1995). The participants were told to swallow, and to allow the saliva to accumulate in their mouth during all the time of the treatment, and then to spit it into a collecting vessel. Time was measured in all cases exactly and secretion rate was calculated as ml/10min. Saliva samples were frozen and stored at -20°C until use.

Analysis of saliva: Saliva volume was measured with the use of a small measuring tube, and sample was clarified by centrifugation (20.000g, 4°C, 10min) before further analysis. Protein content was determined by the widely used method according to Lowry, Rosenbrough, Farr and Randall (1951). Amylase activity was determined with Phadebas Amylase Test (Pharmacia Upjohn, Sweden).

Statistical analysis: T-tests, and ANOVA were calculated using the Statistical Package for the Social Sciences SPSS/PC version 8.0.

B: Clinical effectiveness:

Subjects: 11 oral psychosomatic patients (3 male, 8 female, age ranged from 39 to 79 /mean:57,6/) with a very low motivation to psychotherapy were treated with photo-acoustic stimulation as an initial phase of psychotherapy.

Photo-acoustic stimulation: Photo-acoustic stimulation was carried out with the use of a signaller ("David paradise XL", Comptronics Devices Ltd. Edmonton /Alberta/ Canada) through closed eyes, with a mixed stimulation with a mean frequency of 8Hz as photic and acoustic stimulus, for 20-30 minutes. The stimulation was combined with hypnosis induction and a scarcely audible relaxing music mixed with pleasant natural noises (i.e.: Arnd Stein: "Phantasie").

Hypnosis: Hypnosis was induced during photo-acoustic stimulation, with suggestions about relaxation and counting backwards. Hypnosis induction was followed and trance state was utilised with the imagination of an "inside eternal fountain-head of energy and love."

Procedure: Combined (photo-acoustic and hypnosis) treatment was carried out once a week (for 3-15 weeks, see Table 3). The aim of this phase was to reduce symptoms, and to orient the patient's thinking from the somatic symptom and somatic medical and dental treatment possibilities to the internal processes, and to develop a patient-therapist relationship strong enough for entering the explorative part of the psychotherapy even with this unconvinced patients.

Registration of the effects: Symptoms were checked weekly on the basis of the report of the patients. We counted as "improvement" if the patient reported significant effect of the treatment, but the symptom did not disappear entirely. We counted as "recovery" if the patient reported the symptom fully disappeared.

Hypnotic susceptibility: Hypnotic susceptibility was measured with the Hungarian version (Greguss et. al., 1975) of the Stanford Hypnotic Susceptibility Scale Form A (Weitzenhoffer & Hilgard, 1959) just after the initial "photo-acoustic" part of the psychotherapy, as a "first step" of the second, exploratory part of the psychotherapy.

Results

Data from phenomenological effects of trance induction and psycho-physiological changes of saliva secretion in the case of all of the students participated is summarised in Table 1.

Photic stimulation did not significantly increase the altered experiences, and salivary protein concentration, and did not significantly decrease the arousal level and the volume of secreted saliva comparing to relaxation. Salivary amylase concentrations were nearly the same in the case of both conditions. There were no significant differences related to gender as well. However alterations of awareness was significantly ($p<0.05$) higher in the case of photic stimulation than relaxation.

Table 1. Phenomenological and psycho-physiological changes in the conditions of photic stimulation and relaxation. (Total sample $n=33$ /. Standard deviations in brackets, $*=p<0.05$)

Treatment	Photic stimulation			Relaxation		
	m	fm	total	m	fm	total
Gender	15	18	33	15	18	33
n						
Pekala's Experiences	2.30 (1.2)	2.68 (1.4)	2.51 (1.3)	2.32 (1.2)	2.06 (1.0)	2.18 (1.1)
Pekala's Awareness	2.37 (2.0)	3.27 (1.7)	2.86* (1.8)	1.98 (2.0)	1.92 (1.8)	1.95* (1.9)
Pekala's Arousal	1.63 (1.7)	1.23 (1.5)	1.42 (1.6)	1.47 (1.3)	1.94 (2.0)	1.73 (1.7)
Volume ml/10min	1.69 (1.4)	2.55 (1.7)	2.16 (1.6)	2.01 (2.0)	3.26 (1.9)	2.69 (2.0)
Protein mg/ml	7.24 (4.0)	6.33 (4.6)	6.74 (4.3)	7.63 (4.9)	5.08 (2.3)	6.24 (3.8)
Amylase U/mlX10-1	5.58 (2.2)	4.84 (2.7)	5.18 (2.5)	5.29 (2.3)	5.11 (2.9)	5.19 (2.6)

The differences related to the three conditions were statistically significant ($p<0.05$) only in the case of arousal level related to photic stimulation and group hypnosis. In the case of photic stimulation salivary protein concentration significantly decreased ($p<0.05$) compared to group hypnosis. Amylase secretion significantly increased ($p<0.05$) compared to the hypnosis values. In the case of the volume of secreted saliva hypnosis induced significantly ($p<0.05$) stronger decrease of saliva volume than relaxation.

Table 2. Phenomenological and psycho-physiological changes in the conditions of photic stimulation, relaxation and hypnosis. (Hypnosis group $n=13$ /. standard deviation in brackets, $*=p<0.05$)

Treatment	Photic stimulation			Relaxation			Group hypnosis		
	m	fm	total	m	fm	total	m	fm	total
Gender	5	8	13	5	8	13	5	8	13
n									
Pekala's Experiences	2.64 (1.3)	3.00 (1.4)	2.86 (1.4)	2.28 (1.0)	1.73 (0.8)	1.94 (0.9)	2.44 (0.3)	2.29 (0.3)	2.35 (0.3)
Pekala's Awareness	3.14 (2.0)	3.33 (1.7)	3.25 (1.8)	2.26 (1.8)	2.20 (1.6)	2.22 (1.7)	2.64 (1.5)	2.38 (0.5)	2.48 (1.0)
Pekala's Arousal	0.80 (0.8)	1.15 (0.5)	1.02* (0.7)	0.90 (1.2)	2.63 (1.9)	1.96 (1.6)	2.30 (1.0)	2.44 (1.4)	2.39* (1.2)
Volume ml/10min	2.48 (1.4)	2.42 (1.7)	2.45 (1.6)	3.32 (2.1)	2.76 (2.1)	2.98* (2.1)	1.64 (1.5)	1.46 (0.9)	1.53* (1.1)
Protein mg/ml	6.36 (1.9)	4.86 (2.3)	5.46* (2.1)	7.57 (4.9)	5.45 (2.3)	6.26 (3.8)	9.35 (3.6)	8.12 (2.8)	8.59* (2.8)
Amylase U/mlx10-1	5.90 (2.3)	5.81 (2.7)	5.84* (2.6)	5.74 (2.2)	4.54 (2.8)	5.00 (2.7)	4.37 (2.5)	4.19 (2.5)	4.26* (2.4)

Table 3. Clinical effectiveness of the combined photo-acoustic stimulation and hypnosis treatment (Denture int. = Psychoogenic denture intolerance; Impr. = treatment No when the first improvement occurred; Recov = treatment No when the recovery (if any) from the symptom occurred; Enter = treatment No when the patient entered to the explorative psychotherapy.)

Case No.	Age (Years)	Sex	SHSS Score	Psychoogenic Symptoms	Impr.	Treatment No Recov.	Enter
1	68	M	6	Oropyrrosis	2	-	8
2	79	F	7	Oropyrrosis	1	-	9
3	76	F	5	Running nose during denture wearing	2	6	7
4	42	F	11	Phantom pain Denture int.	2	3	4
5	65	F	7	Phantom pain	1	2	3
6	44	F	4	Chronic pain	10	-	15
7	45	M	4	Chronic pain	4	-	8
8	39	M	2	Facial tic	3	8	9
9	69	F	11	Denture int.	2	5	7
10	52	F	9	Denture int.	2	7	8
11	55	F	6	Denture int.	2	5	6

In the clinical part of the investigation authors found at least partially symptom palliation in all the cases even with patients of low hypnotic susceptibility. In 7 cases (64%) the symptoms disappeared totally ("recovery"), and the method was moderately effective in the cases of remaining patients (36%) ("improvement"). The development of a strong enough patient-therapist relationship occurred in all the cases (100%) in connection with the appearance of the symptom palliating effect, and some more treatments were needed to close this phase, and change the style of the therapy. After these the entrance to the exploratory part of the psychotherapy became possible in all of the cases (100%). Clinical results are summarised in Table 3.

Conclusions

On the basis of the preclinical part of the study, in the case of most of the measured parameters like arousal, altered experiences and psycho-physiological changes, photic stimulation and relaxation seems to be similar, in accordance to the literature (Williams & West, 1975; Brauchli, 1993). However photic stimulation seems to have a decided elevated effectivity to induce trance since it significantly increases the values of altered state of awareness comparing to relaxation. Photic stimulation also induced significantly deeper arousal level than group hypnosis did, and salivary protein concentration was significantly decreased and amylase secretion was significantly increased comparing to the hypnotic values as well. Beside the similarities, these inequalities indicate the decided difference of the effects of photic stimulation comparing to relaxation and group hypnosis. Based on this differences the photo-acoustic stimulation method introduced in this article seems to have an advantageous trance inductive effect com-

paring to relaxation, and even to group hypnosis. That can be the reason of the very high effectivity of this method as an initial phase of psychotherapeutic treatment of patients bound to somatic medical or dental treatments with a low motivation and scepticism to psychotherapy. Patients who tend towards somatic treatments, accept this technique more easily, since the use of the photo-acoustic signaller ("the machine") gives them the illusion getting of a "real" "somatic type" treatment. Because of this, and in connection with the spontaneous trance inductive action and the nice flash light stimulated visions using this technique, even patients with low motivation and low hypnotic susceptibility can have a delightful trance state experience (see also Pekala & Forbes, 1988), which helps to keep these patients in the psychotherapeutic relationship. The effective stimulation, especially the photic stimulation may have an antidepressive effect, as well.

Although, the authors find these early results encouraging, further detailed investigations will be needed to find out the possible roles of this interesting and effective technique in the treatment of oral psychosomatic diseases. The authors should emphasize that the clinically impressive early effects of this technique, would have been quickly destroyed without the continuation of the psychotherapy with the exploratory part.

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